

REMARKS

Favorable reconsideration is respectfully requested.

The claims are 1 to 12.

Claims 1 to 12 have been rejected under 35 U.S.C. 102(e) as being anticipated by USP 6,703,474 (Abstract, cols. 1-10, 21, Example 3-1 and 3-3).

This rejection is respectfully traversed.

The present invention is directed to a method for producing a polyethylene terephthalate for molding.

(1) The starting material

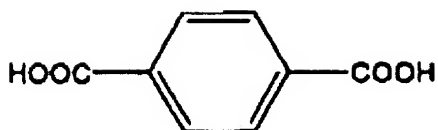
The starting material is bis (2-hydroxyethyl) terephthalate (BHET) in the present process.

The starting material is an aromatic dicarboxylic acid or its ester-forming derivative and ethylene glycol (EG) in US 6,703,474 (US '474 hereinafter). Terephthalic acid (TA) is used in the examples as the aromatic dicarboxylic acid.

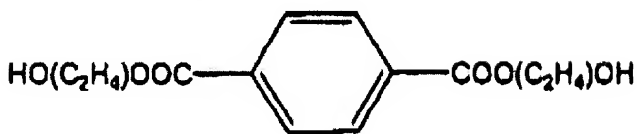
TA or dimethylterephthalate (DMT) is used as a starting material for polyethylene terephthalate (PET) in a conventional process.

Until recently, the process for producing PET by using BHET as a starting materials has not been studied, since high purity BHET was not available on an industrial scale, before the present inventors proposed chemical recycling of PET, as explained on pages 7-26 of the present specification. The chemical recycle method is disclosed in WO 01/10812 (corresponds to US 6,630,601) described in page 10, line 22 of the specification. In the chemical recycle process, PET is decomposed to BHET and is purified.

TA and BHET are structurally different substances as described below.



(TA)



(BHET)

BHET has EG unit. Thus, BHET does not have to be reacted with EG.

Therefore, the present invention is different from that of the foregoing in respect of the starting material.

(2) An acid value

The present claims recite that BHET having an acid value of 30 mgKOH/g or less is used as the starting material. The present invention is based on the finding that PET which contains low cyclic trimer can be produced by using BHET having an acid value of 30 mgKOH/g or less as a starting material (page 4, lines 14-32 of the specification).

On the contrary, the acid value of starting material in US '474 is estimated to be very high, since US '474 uses TA which has acid groups (-COOH).

The acid values of starting material of Example 3-1 and comparative Example 3-3 of US '474 are as follows.

Example 3-1

Starting material = TA 13 kg + EG 5.21 kg + BHET 0.3kg = total 18.5 kg

TA has a molecular weight of 166. The molar amount of TA is $13/166 = 0.078$ mol. TA has two -COOH groups in one molecule. Thus, TA has $2 \times 0.078 = 0.156$ mol of -COOH group.

KOH has a molecular weight of 56.11. To neutralize the -COOH groups in TA, $0.156 \times 56.11 = 8.75$ kg of KOH is needed.

Accordingly, the acid value is $8.75 \text{ kg KOH}/18.5 \text{ kg} = 473 \text{ mg KOH/g}$

Example 3-3

Starting material = TA 13 kg + EG 12.2 kg + BHET 0.3kg = total 25.5 kg

The molar amount of TA is $13/166 = 0.078$ mol. Thus, TA has $2 \times 0.078 = 0.156$ mol of -COOH group.

KOH has molecular weight of 56.11. To neutralize -COOH groups in TA, $0.156 \times 56.11 = 8.75$ kg of KOH is needed.

Accordingly, the acid value is $8.75 \text{ kg KOH}/25.5 \text{ kg} = \underline{343 \text{ mg KOH/g}}$

As apparent from the above calculation, the acid value of Example 3-1 (473 mg KOH/g) and Comparative Example 3-3 (343 mg KOH/g) of US '474 are very high in comparison with that of the present invention.

(3) Cyclic trimer

The PET obtained in the present invention has a cyclic trimer content of 2,000 ppm or less (claim 1).

The cyclic trimer content of PET is 0.30-0.31 wt% (3000-3100 ppm) in Examples 4-1 to 4-3 of US '474 (column 60, Table 4).

The rejection states that US '474 discloses a cyclic trimer content of not more than 0.05 wt% (500 ppm) in page 8, lines 6-8 of the Office Action. However, this is not correct. US '474 discloses that a cyclic trimer content between after molding and before molding is not more than 0.05 wt% (500 ppm) in column 11, lines 24-33.

Accordingly, the content of cyclic trimer of the present invention is completely different from that of US '474.

The PET obtained in the present invention is very useful for molding material (page 7, lines 13-17 of the specification).

The object of present invention is to provide PET having low cyclic trimer content. On the other hand, the object of US '474 is to suppress the elution of antimony (column 3, lines 48-54). Thus, the object of US '474 is completely different from the object of the present invention.

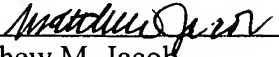
For the foregoing reasons, it is apparent that the rejection on prior art is untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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